

BULLETIN No. 2.

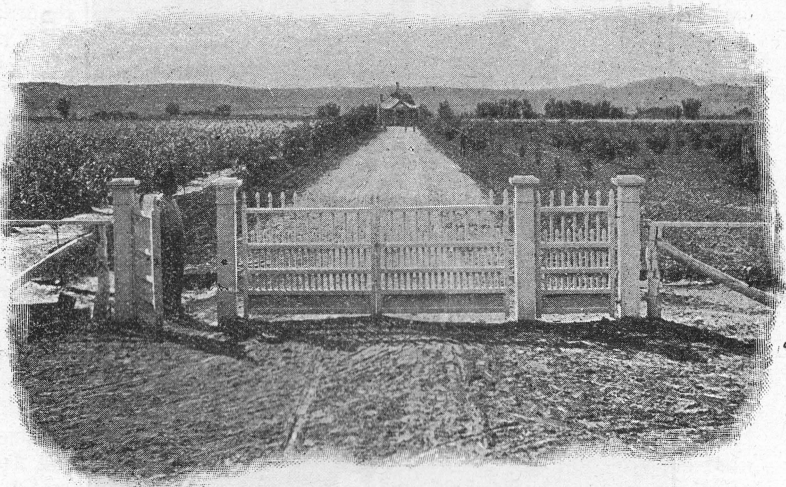
Southern Utah Experiment Farm,
ST GEORGE, UTAH.

CONDUCTED BY THE
UTAH STATE BOARD OF HORTICULTURE.

Orchard Experiments

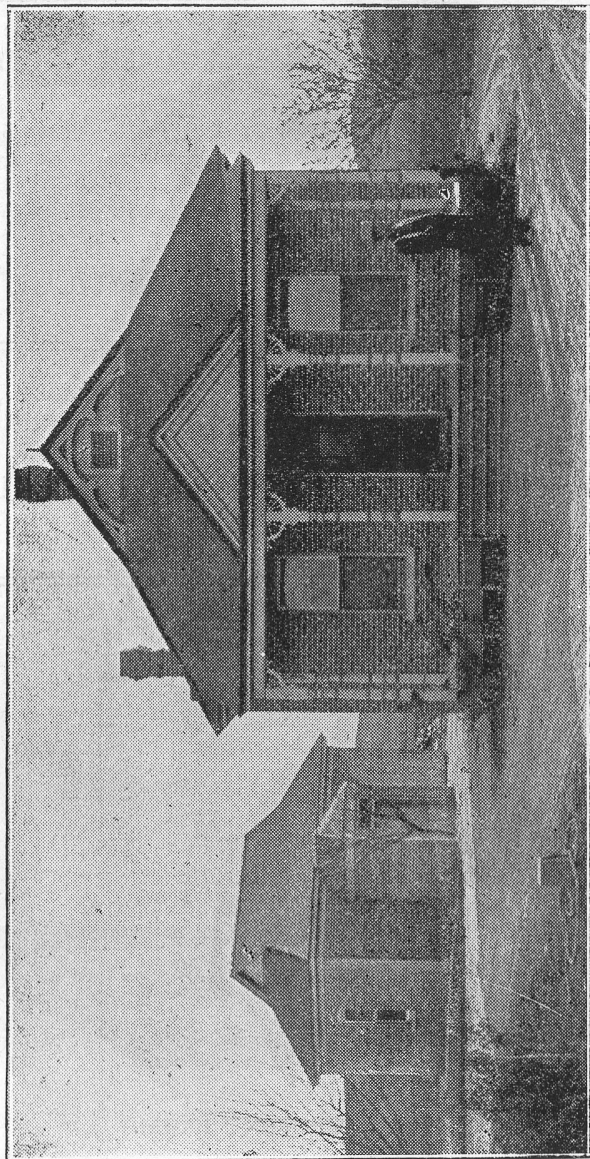
FOR THE
Promotion of Fruit Growing in Southern Utah.

BY JOSEPH H. PARRY



THE EXPERIMENT FARM.

SALT LAKE CITY, JANUARY, 1905.



STORE HOUSE AND MANAGER'S RESIDENCE.

SOUTHERN UTAH ORCHARD EXPERIMENTS.

The Utah Legislative Assembly of 1899 provided for the establishment of the Southern Utah Experiment Farm, with a view to the special promotion of the fruit-growing industry of the arid and semi-tropical region of Washington County, familiarly called Utah's Dixie. This district, by reason of its mild climate, rich volcanic soil and other conditions, is especially fitted for growing many semi-tropical fruits of unexcelled quality. Its limited area of irrigable land demands intensive culture, and the growing of such crops as yield the greatest returns per acre, and which offer the most lucrative employment to those engaged in their production, in order to afford subsistence for the increasing population. No crop is better fitted for this purpose in Washington County than fruit, the production of which, both in its fresh state and cured, will furnish congenial employment to old and young.

The farm was placed under the control of the State Board of Horticulture, whose members have planned and devised means for conducting the experiments for which it was established. The immediate supervision of the work has devolved upon the board member for that district, Thomas Judd, who has spent considerable time at the farm during the last five years, or since its establishment and location by a commission appointed by the Governor of the State. To Mr. Judd's earnest efforts and good judgment the present excellent condition of the farm is due. George F. Jarvis, an experienced horticulturist of Washington County, was foreman of the farm from January 1, 1900, when the first work of making the farm really began, till February 28, 1902. The first orchard and vineyard planting was done by him. Joseph T. Atkin succeeded Mr. Jarvis, and has been foreman since March 1, 1902.

VALUE OF EXPERIMENTAL WORK.

As the climate, soil and other conditions of Southern Utah are especially adapted to the growing of vinifera grapes, figs, almonds, pomegranates and other semi-tropical fruits, and as this industry is the chief agricultural dependence of the people of Washington County, the need and value of large experimental work had long been felt by Dixie farmers. It was not only needed to determine the most profitable types and varieties of trees and vines to plant, but also to illustrate how to plant, prune, cultivate and irrigate the same for the best results, and then to take care of the fruit and show how to prepare it for commercial purposes.

The work of the farm is intended to save orchard and vineyard growers years of costly experiments, and from expensive

mistakes. In a former Bulletin (No. 1, "Grape Growing and Raisin-Making in Southern Utah"), issued in January, 1904, is shown the value of the work done at this experiment farm in developing and promoting the grape and raisin industry in Southern Utah. Five years ago this industry was an insignificant factor in the economic conditions of this region, but through the influence of the experiment farm, the growth of the grape industry is already very marked, and the viticultural future of Dixie seems assured. Tens of thousands of vines have been set out throughout this region, and over into Nevada, particularly of raisin grapes, and an impetus given the industry that assures its success. What benefits the experiment farm has done for grape culture promises soon to be duplicated in the culture of figs, almonds, pomegranates, peaches and other commercial fruits and nuts. From its orchards and vineyards, embracing a very large number of varieties, have already been scattered thousands of scions, buds and cuttings of new and promising fruits among the farmers of the entire Dixie country.

The farm has illustrated, year after year, the economical and proper use and application of water when used in irrigating soils heavily charged with alkali salts. It has demonstrated the value of clean and thorough orchard culture, which has not only kept the mineral in check, but has also conserved the moisture and kept the trees and vines healthy and thrifty, with the use of less than half the water used on adjacent irrigated farms.

LIST OF FRUITS ON TRIAL.

The following is the list of fruits and other trees planted and now being tested at the Southern Utah Experiment Farm, with the number of each set out:

APPLES—Yellow Transparent, 66; Newtown Pippin, 3; Red Astrachan, 9; Red June, 9; Gano, 18; Ben Davis, 18; Missouri Pippin, 10; Jonathan, 18; Hyslop Crab, 6; Martha Crab, 12.

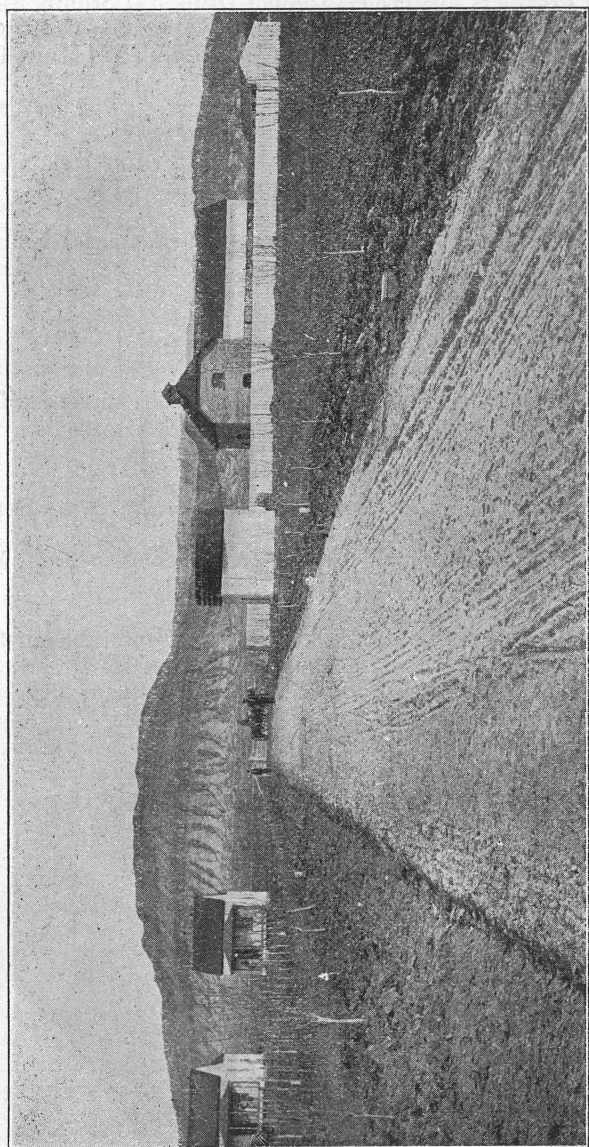
APRICOTS—Blenheim, 4; Hemskirke, 17; Spark's Mammoth, 17; Jones' Early, 18; Tilton, 18; Moorpark, 18.

FIGS—Black San Pedro, 17; White San Pedro, 17; Smyrna, 14; Capri (wild), 3; Brown Turkey, 13; White Eudich, 13; White Adriatic, 10.

NECTARINES—Early Vibert, 34; Boston, 34; Warwick, 34.

POMEGRANATES—Papershell, 7; Wonderful, 10; Sweet Fruited, 10; Spanish Ruby, 50.

PEACHES—Thurber, 21; Stewart, 4; King's Prize, 34; Hale's



WORKMEN'S COTTAGES, WATER TANK, STABLE AND TOOL SHED.

Early, 34; Utah Orange, 34; Lemon Free, 34; Heath Cling, 34; Oldmixon Cling, 34; Orange Cling, 34; Lemon Cling, 34; Oldmixon Free, 34; Foster, 34; Golden Drop, 34; Stump, 34; Elberta, 34; Sneed, 18; Alexander, 18; Indian Cling, 18; Crawford's Late, 18; Leavy Late, 8; Champion, 10; Wheatland, 18; Muir, 10.

PEARS—Bartlett, 6; Winter Bartlett, 9; P. Barry, 9.

PLUMS—Wickson, 4; Satsuma, 4; Prunis Simoni, 66; Blue Damson, 18; Yellow Egg, 18; Imperial Gage, 10.

PRUNES—Sugar, 13; Golden, 17; Imperial Epineuse, 17; Tragedy, 17; Silver, 17; Hungarian, 17; French, 17; German, 17; Italian, 17; Splendor, 18.

QUINCES—Pineapple, 7; Smyrna, 10.

ALMONDS—Paper Shell, 4; Ne Plus Ultra, 4; Jordan, 17.

PECAN NUTS—Papershell, 17.

WALNUTS—Parisienne, 9; Santa Barbara Softshell, 8; Ford's Improved Softshell, 9.

GRAPES—Raisin: Thompson's Seedless, 438; Muscat of Alexandria (Gordo Blanco), 432; Zante, 156.

Table and Shipping: Chasselas de Fontainbleau, 39; Chasselas Golden, 78; Chasselas Rose, 117; Chasselas Vibert, 39; Early Madeline, 37; Black Morocco, 117; Gros Colman, 78; Sabal Kan-ski, 117; Golden Champion, 78; Bowood Muscat, 78; Almeria, 78; Flame Tokay, 78; Black Prince, 129; Purple Damascus, 39; Emperor, 215; Black Cornichon, 640; Royal Muscadine, 78; Early Silver Frontignan, 39; Black Ferrara, 190; Lady Downs, 78; Black Hamburg, 8.

Wine Grapes: Black Malvoise, 78; Johannesburg Reisling, 78; Feher Zagos, 19; Zinfandel, 156; California Mission, 75.

Resistant Vines: Rupestris St. George, 349; Solonis, 40; Riparia a Grandes Feuilles, 40; Rupestris Metallica, 40; Riparia Glorie de Montpellier, 40.

Grapes Grafted on Resistant Stock: Muscat of Alexandria on Riparia, 40; Emperor on Riparia Metallica, 40; Black Cornichon on Rupestris St. George, 40; Thompson's Seedless on Riparia G. Feuilles, 10; Flame Tokay on Solonis, 20.

The preponderance of the experiments in grape culture at

the Farm is justified in the fact that the climate and other conditions of Dixie warrant the presumption that viticulture will become the chief horticultural industry of this entire region, and when it is established on a permanent and intelligent basis it will become a source of untold wealth to this section of the state. Early fruits of the peach and apple will soon become important economic factors in this district, as soon as shipping facilities favor this branch of the industry.

VARIETIES RECOMMENDED FOR SOUTHERN UTAH.

The introduction of new varieties of grapes, more profitable and of better quality than the old kinds formerly grown in this congenial clime, has been of inestimable value to the people. The following varieties have been thoroughly tested and are confidently recommended for extensive planting: Black Cornichon, Flame Tokay, Purple Damascus and Black Ferrara, all noted for their fine table and shipping qualities. These, with Thompson's Seedless and Muscat of Alexandria for raisin-making give a variety unexcelled for Dixie vineyards.

INTRODUCTION OF RESISTANT VINES.

One important line of work of experimental investigation undertaken by the farm management is the determination of the relative adaptability of resistant vines to the various types of soil found in Southern Utah, and of the congeniality of such stocks to the leading European vines (*Vitis vinifera*, L.). All the grapes

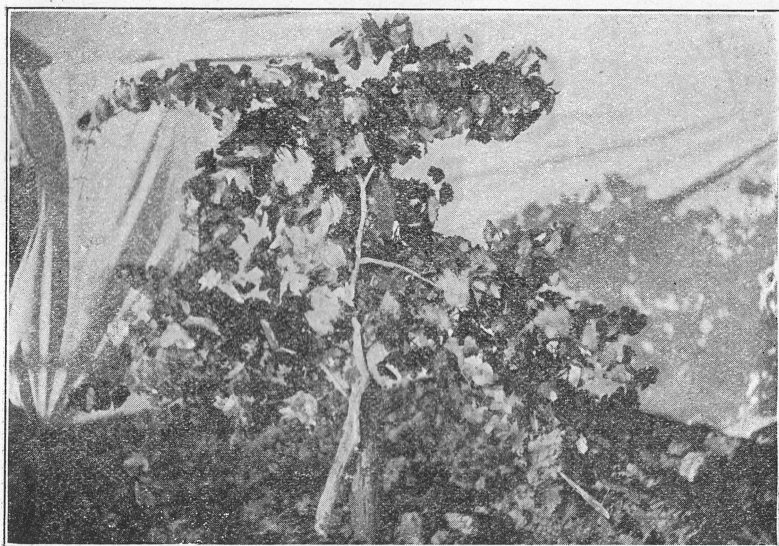


Plate 1—THOMPSON'S SEEDLESS ON RUPESTRIS ST. GEORGE.

cultivated in Southern Utah, with few exceptions, belong to this species. The need of this investigation arises from the fact that the phylloxera, which destroyed practically all the vineyards of France some years ago, and which has seriously injured the vineyards of California, will sooner or later invade this warm climate, and the vinifera vines will succumb to the attacks of this destructive insect when on their own roots. So far, this pest has resisted all attempts to eradicate it.

The only satisfactory method thus far discovered of combating phylloxera is the use of resistant vines, some species of



Plate 2—BLACK CORNICHON ON RUPESTRIS ST. GEORGE.

which are applicable to all conditions. A resistant vine is one which is able to keep alive and grow even when phylloxera are living upon its roots. Its resistance depends upon two facts: first, that the insects do not increase so rapidly on its roots; and, second, that the injurious punctures of the insects do not extend deeper than the bark of the small roots and are sloughed off every year, leaving the roots clean and healthy. The resistant grapes were originally wild American vines, natives of the Mississippi valley, where the phylloxera also originated. These have been taken in hand by the French viticulturist, improved by hybridization and selection, until today a large number of varieties of resistant vines are offered, which are suited to every variety of soil,



Plate 3—MUSCAT OF ALEXANDRIA ON RUPESTRIS ST. GEORGE.

location and climatic condition, and which resist the attacks of the phylloxera in a greater or less degree.

The experiments conducted at the state farm, and what is learned therefrom, will be helpful to the Dixie vineyardist in showing him what to plant and how to plant it when the insect enters his own or his neighbor's vineyard. It will save him from costly experiments, perhaps from expensive failures, and he will not have to trust to the experience of some one else whose conditions may differ in some way from his own.

The first resistant vines to be planted at the experiment farm were the Rupestris St. George. From its behavior thus far, this type is considered best adapted to the soil and climate of the Dixie country. Upon these resistants have been grafted at the farm Thompson's Seedless, Cornichon and Muscat of Alexandria. (Pictures of one season's thrifty growth of these vines are shown in plates, 1, 2, and 3.) Other resistant vines planted in 1904 are the following: Solonis, Riparia a Grandes Feuilles, Rupestris Metallica, and Riparia Gloire de Montpellier. The season's growth of these wild vines, ungrafted, is shown in plate 4.

These important experiments will be continued to a definite conclusion, and will undoubtedly be most helpful in guarding the viticultural interests of Southern Utah against the invasion of the worst enemy now known to the grape industry.

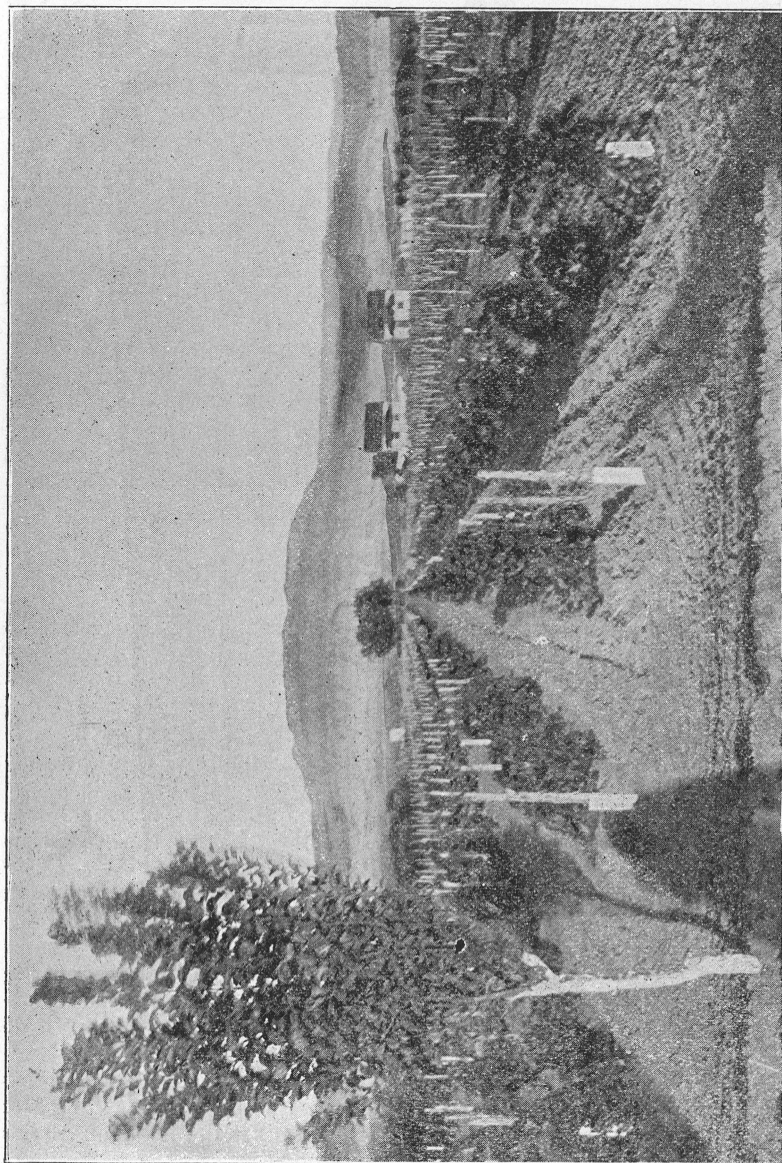


Plate 4—RESISTANT VINES PLANTED IN 1904.

IRRIGATION AND CULTURAL WORK.

In the absence of water measuring weirs and devices, no determination has yet been made as to how much water has been applied to each plat of trees and vines in inches or acre feet, but records have been kept of the number of irrigations and cultivations each plat has received during the year, including both summer and winter irrigations. Modern measuring weirs are now under construction, and hereafter it is intended to determine the exact amount of water needed to mature the various kinds of fruit grown in this semi-tropical climate.

This line of experiment will be of incalculable value to this entire region, where irrigating water is so limited. Every inch of water saved means an increased area of cultivated soil, as there is in Southern Utah tens of thousands of acres of ideal grape and fruit land now lying idle and worthless because there is no water for it.

Grape vines have been irrigated from two to seven times, but were cultivated twelve times. Some varieties were irrigated but twice, with a view to checking late growth, to give the vines time to mature or harden up, that they may be less subject to frost in winter. Some of the more tender varieties of *vinifera* vines freeze down to the ground in winter in this section, if allowed to make too luxuriant a growth late in the season. The Lady Downs, Black Ferrara, Flame Tokay and Mission grapes are among the tenderest and most susceptible to frost, hence should receive less irrigating water and fewer cultivations than some other varieties to force early maturity. The Muscat of Alexandria, Thompson's Seedless, Chasselas Fontainbleau (Sweetwater), and Black Malvoise are almost hardy enough, without winter covering, for the climate of Salt Lake valley. This is particularly true of the last named, which seldom freezes down to the ground in the winter, and it is also a most excellent table grape.

Peach, prune and plum trees on the farm were irrigated but six times during the entire year, and cultivated fourteen times, twice with a disk harrow. The benefit of keeping a mulch of loose soil over the entire surface of the orchard by frequent cultivation is shown in the thrifty appearance of the foliage and the trees themselves, which under the treatment given made all the growth that could be desired. Though not in the best peach soil, the trees looked the best in the county, notwithstanding the limited number of irrigations.

Other irrigating experiments would have been made but for the fear of making the farm as "water logged" as neighboring fields. It would be interesting in this connection to know how far winter irrigation could be depended upon to supply the entire need of fruit trees and vines in this region. Such a use of water would greatly extend the culture of all kinds of fruit at small out-

lay. But this work cannot be done at the farm until proper drainage is provided for.

PRUNING EXPERIMENT.

To ascertain the best time to prune the peach and apricot in this latitude, the trees were trimmed at various times during the dormant season. The first was done in the last of October and beginning of November, and the second in February after the hard freezing was over, and just before growth started. The later pruning proved the better, as the wounds healed over clean, while the branches pruned in early winter died back about half an inch, leaving an unsightly spur, which had to be cut away later.

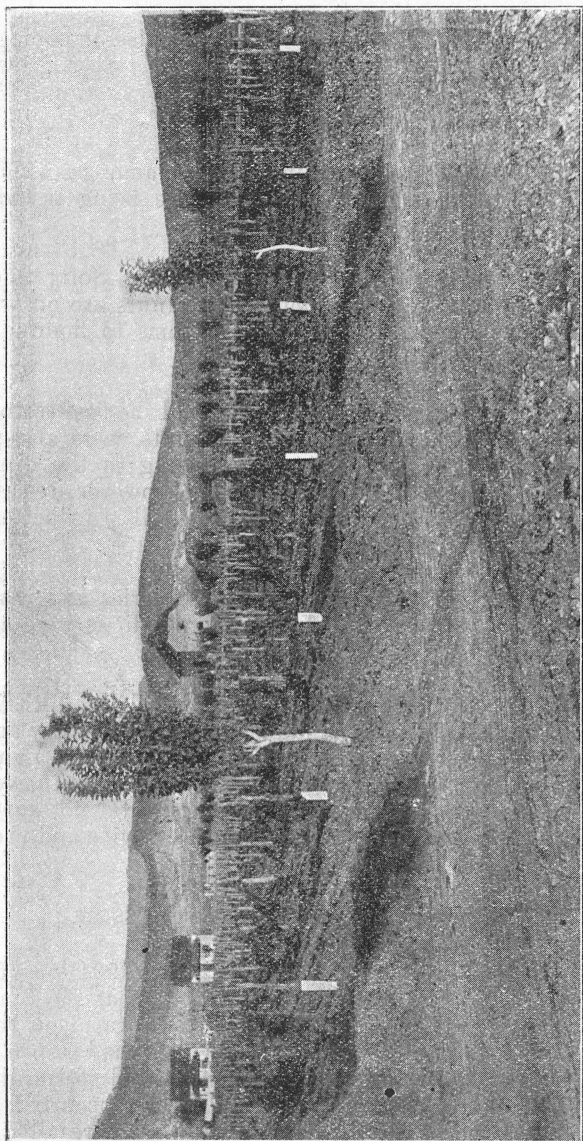
PEACH GROWING IN SOUTHERN UTAH.

Following the grape, the peach seems to come next in commercial importance in the fruit industry in Southern Utah. The peach trees at the experiment farm are as thrifty and vigorous as the native cottonwood, and while the marketing of the fresh fruit is not as yet to be considered as an economic factor, except in nearby mining camps, the evaporated or dried product should at an early day play an important part in the development and prosperity of this region. Large quantities of sundried peaches could be produced which are unexcelled in flavor and other qualities, and would command ready sale at lucrative prices in the leading markets of the country. For years to come the local market will consume all that can be produced in Utah's Dixie. For evaporating purposes, the Muir peach is particularly recommended among others, for its many desirable qualities, and the people of the south will make no mistake in planting largely of this variety for drying purposes, being of excellent sweet quality and producing more pounds of dried fruit to the bushel than any other variety.

When the railroad is within reasonable shipping distance, the early peaches can be put on the Salt Lake and other northern markets, and will rival to some extent the California orchard products. As an evidence of the congeniality of the Dixie climate for peach growing, it may be here mentioned that peach trees can be shown in various parts of the county thirty and forty years old, and still bearing heavy crops of luscious fruit.

SEMI-TROPICAL AND OTHER FRUIT EXPERIMENTS.

FIGS—Some little has been done in fig culture, by way of introducing new varieties. Experiments will be continued and enlarged upon, as the growing of this fruit promises to become a very important feature of the fruit industry in this region. The



RAISIN VINEYARD PLANTED IN 1904.

varieties now on trial are the San Pedro, black and white, Smyrna, Brown Turkey, White Eudich, White Adriatic.

POMEGRANATES—Three new varieties of pomegranates have been introduced. The bushes have made good growth, but have not as yet fruited. Papershell, Sweet Fruited and Wonderful are the new kinds now on trial.

ALMONDS—A variety of almond nuts, amongst which is the celebrated Jordan almond of commerce, are being tested. All give promise of doing well in this region.

WALNUTS—Parisienne, Santa Barbara Soft Shell, and Ford's Improved Soft Shell varieties of walnuts are on trial, and give promise of succeeding, as this nut seems to flourish in this district of Utah.

PECANS were tried, but barely survived the first season. The Pistachio nut, Japan and American chestnuts, were also planted, but failed the first season, presumably owing to the overabundance of alkali. Further experiments may, however, result differently with some of the varieties, since the soil is in better condition and supplied with more humus.

SMALL FRUITS—Dewberries, gooseberries and raspberries have been tried, but were killed with the alkali, as were also four varieties of strawberries.

FOREST, SHADE AND ORNAMENTAL TREES—The Ash, Ailanthus, Mulberry are indigenous to the country and flourish wherever permitted to grow. The Catalpa Speciosa and Texas Umbrella trees were planted on the farm and seem to thrive as well as the natives. The Sycamore or Plane tree did not survive the first season. Of 100 Monterey Cypress, ten survive and promise to make beautiful specimens.

FROST DISASTER AND ITS LESSON.

There was every promise in early Spring (1904) of a fine crop of grapes, peaches, apricots, plums and prunes at the State farm. All the above fruits started well; fruit had formed on the grape vines, and that on the apricot and peach trees had grown as large as hazel nuts when, on April 24, following a cold storm, the severest frost known at this season in twenty years occurred, and the destruction of nearly all the fruit on the farm resulted. Much of the fruit of the entire section was more or less damaged at the same time. The catastrophe was a severe loss to the farm, as it disarranged plans which had been made to convert the fruit crop

into commercial products, such as raisins, and evaporated and sun-dried fruits of various kinds, with a view of illustrating best methods of accomplishing this work, for the benefit of the fruit growers of the Dixie country. This experimental work, so highly important to the success of the fruit industry in that section of the State, is of necessity deferred for another season.

As a similar frost may occur again at any time in Dixie, and as it occurs in one part or another of the State every year, nearly always the culmination of a protracted storm, it will be well for Utah orchardists to provide means for protecting their fruit plantations against injury or destruction when frosts threaten, by the use of smudge fires. In Europe, resort is frequently had to this method of guarding against frost. Damp straw or old hay, green brush, tar, turpentine, asphaltum, anything that will result in the greatest amount of smoke will serve as fuel for these fires. It is the blanket of smoke which protects against frost, not the heat of the fires, so damp fuel should be used to make the smoke as dense as possible. The fires should be on the windward side of the orchard or vineyard, if there be wind, or scattered through the plantation if calm, but in no case too near either tree or vine to burn them. Have the fuel on the ground in advance, and start the fires while the temperature is several degrees above the danger point.

Various patented compositions are offered in European markets as substitutes for the bundles of straw and other primitive smudge material, but the French vine growers generally use bundles of small faggots, in which they insert half dried hay and wet straw. A line of about fifty suffices for a hundred acres. When obtainable, tar or native asphaltum would make good material for smudge fires.

This method of protecting orchards from the disastrous results of late Spring frosts is applicable to all sections of the State. It costs but little, and if it saves but a part of the fruit, it is well worth the effort, and the lesson of the disastrous Spring frost of 1904 will not be lost.

NEED OF MORE EXTENSIVE FRUIT PLANTING.

In all lines of horticulture hitherto, the principal drawback of Southern Utah has been that the fruit growers did not plant enough of any one kind to make the business worth while. The production of raisins alone would be a source of untold wealth, and peach growing could be made a veritable bonanza in this section. There is immediate demand for any quantity of raisins and fancy dried fruits in the markets of the state, but the writer doubts if a carload of cured fruits could be collected at the present writing in Washington county. The same conditions obtain in the growing of figs, one of the most delicious fruits of this semi-tropical clime,

and a very profitable orchard product. The trees flourish everywhere, notwithstanding the very poor care generally given them, yet there is probably not one orchard of figs an acre in extent in all of the Dixie country.

The State Experiment Farm will do much to place all branches of the fruit industry in Southern Utah upon a permanent and paying basis. If the people will but plant the trees and vines recommended, the farm management will instruct them not only in the principles of the propagation and culture of the fruit best adapted to this favored region, but also in methods of harvesting, curing, packing, shipping and marketing the products of their orchards and vineyards, and make the fruit industry the most lucrative in that part of the state.